DTC P0171 and DTC P0172 Troubleshooting Tips

DTC P0171 (fuel system too lean) and DTC P0172 (fuel system too rich) can set when the ECM/PCM makes adjustments to the fuel mixture that are out of range in relation to the input from the heated oxygen sensor (HO2S). Honda ULEV and SULEV vehicles use a universal exhaust gas oxygen (UEGO) sensor. You'll see the values for this sensor listed as Air/Fuel Feedback (AF FB) on the PGM Tester display screen. Here's a handy table to help you diagnose and repair DTC P0171 and DTC P0172 problems.

Parameter	Expected Values
Long Term Fuel Trim (LT FT) or Air/Fuel Feedback Average (AF FB AVG)	LT FT or AF FB AVG normally reads 1.00 on the PGM Tester. When the LT FT or AF FB AVG values reach .85 (rich) or 1.15 (lean), the MIL comes on and the appropriate DTC sets.
Short Term Fuel Trim (ST FT) or Air/Fuel Feedback (AF FB)	ST FT or AF FB normally fluctuates around 1.00 and should *not* hold a high or low value. If the ST FT value is high or low, find the driving condition, using freeze data, that causes the ST FT to peak.
Engine Coolant Temperature (ECT)	0.5 to 0.7 volts hot (normal range)
Intake Air Temperature (IAT)*	1.0 to 2.0 volts hot (normal range)
Throttle Position (TP) Sensor	0.5 volts (closed throttle) to 4.5 volts (wide-open throttle)
Barometric Pressure (BARO)**	2.8 to 2.9 volts at sea level; 2.5 volts at 5,000 feet
Manifold Absolute Pressure (MAP)**	0.8 to 1.0 volts at idle, no load
Exhaust Gas Recirculation Valve Lift Sensor (EGR VLS)	1.1 to 1.25 volts at idle
Manifold Vacuum	The manifold vacuum should be 20 inches or the equivalent MAP sensor voltage less than 1.0 volt when idling at sea level, no load. If the MAP sensor voltage is higher than 1.0 volt, the engine has low manifold vacuum that will result in a rich mixture. Some causes for low manifold vacuum are tight or leaking valves, incorrect camshaft timing, low compression, or an EGR valve that's stuck open.
Fuel Pressure	On models with vacuum-operated fuel pressure regulators, make sure you measure fuel pressure with the pressure regulator vacuum hose connected and disconnected. Refer to the appropriate S/M for fuel pressure specifications.
Fuel Injectors	Connect the fuel pressure gauge, and start the engine. Turn off the engine, slowly and carefully pinch the return hose, and check the fuel pressure leak down rate. If the fuel pressure decreases by more than 10 psi in 30 minutes, an injector is leaking and causing a rich mixture. Debris in the injector screens can cause a DTC P0171 or P0172. If you find debris, replace the injector, and find the source of contamination.

* ECT and IAT sensor voltage should be the same when the engine is cold.

** MAP and BARO sensor voltage should be the same with the ignition switch turned on and the engine off.

New Software for PGM Tester: SN211

The latest PGM Tester software version SN211 (1/21/02) was sent to your service manager on the February HONDANET CD. To load the software into the PGM Tester, use your 8MB program card and the normal updating procedure (see the article "How to Install PGM Tester Software" in the October '98 issue of *ServiceNews*). For info about updating on the Interactive Network or on the DCS workstation, or for general CD questions, call the HONDANET Support Center at **800-245-4343**. For info on vehicle systems or using the PGM Tester, call Special Tools at **800-346-6327**. For warranty policy inquiries, call Warranty at **310-783-3240**.

Here's some important info on SN211:

- The new EVAP system function test has been expanded. It now covers '98–02 Accords, '98–02 Civics, '98–01 CR-Vs, and '99–01 Odysseys. More vehicles will be added in future software releases. See S/B 02-007, *EVAP System Function Testing and Diagnostics With the PGM Tester*, found under Fuel and Emissions, for details.
- Fuel tank pressure sensor (FTPS) has been added where it was missing from the EVAP system single and multiple solenoid function test. You can now read the FTPS voltage.
- On '01–02 Civic 2-doors, the software has been fixed to let you enter EM2; you *don't* need to manually enter the VIN.
- On '00–02 Accord V6s and '99–02 Odysseys, *don't* use the PGM Tester idle adjustment feature in SN211; it can cause an idle fluctuation that resembles a faulty intake air control (IAC) valve. This problem will be fixed in the next software release.

Wrong Injectors Cause DTC P0171, P0172: '96–00 Civic

If DTC P0171 (fuel system too lean) or DTC P0172 (fuel system too rich) sets after you've replaced one or more fuel injectors on a '96–00 Civic, double-check the part numbers; you may have installed the wrong injectors. If the injectors aren't the same (the tips have different colors), the difference in fuel flow rate can cause either of these DTCs to set.

Troubleshooting Multiple Misfire DTCs

NOTE: This article applies to '98–02 Accord L4s, '95–02 Accord V6s, '98–01 Preludes, and '99–02 Odysseys.

When troubleshooting misfire DTCs (P0301 thru P0306) with the PGM Tester, look at the freeze data values for the throttle position (TP) sensor and the exhaust gas recirculation valve lift sensor (EGR VLS).

If the EGR VLS value is more than 1.25 volts, and the TP sensor value is 0.5 volt (closed throttle), the EGR valve opened when it should have been closed, and is defective. Replace the EGR valve.

If the TP sensor value is more than 0.5 volt, and the vehicle speed sensor (VSS) and RPM values indicate that the DTC was set while the vehicle was moving, write down or print out the EGR VLS value. Then, drive the vehicle at the same VSS and RPM as shown in the freeze data, and note the EGR VLS value:

- If the freeze data EGR VLS value is more than 1.25 volts, but the EGR VLS value from the test drive is less than 1.25 volts, the EGR valve was stuck open, and is defective. Replace the EGR valve.
- If the EGR VLS value from the test drive is similar to the EGR VLS value on the freeze data, the EGR valve is OK and *isn't* the cause of your misfire DTC problem. Look for other possible causes.

Troubleshooting DTC P0171, P0172: '98–00 Accord L4

On '98–00 Accord L4s, before you do the repair procedure in S/B 00-018, *MIL Comes On With DTCs P0171 and/or P0172*, found in Fuel and Emissions, refer to page 11-105 in the 1998-02 Accord S/M), and measure the fuel pressure. If the fuel pressure is within specification, *don't* count on replacing the regulator to fix a DTC P0171 (fuel system too lean) or DTC P0172 (fuel system too rich) problem.

For DTC P0171, look for plugged fuel injector screens or low fuel pressure.

For DTC P0172, look for a stuck open EGR valve, tight valves, incorrect camshaft timing, low compression, or leaking fuel injectors.

Troubleshooting Multiple Indicator Lights

The ABS/TCS and ATTS control units communicate with the ECM/PCM. If a DTC causes a loss of communication between two or more of these control units, the loss can cause multiple indicator lights to come on. For instance, when the ABS/TCS control unit stops getting data from the ECM/PCM, it sets a communication DTC such as TCS DTC 31 [engine retard command (PFINH) signal]. This DTC *doesn't* mean there's a circuit or control unit failure. It just means the flow of data between the ABS/TCS control unit and the ECM/PCM has stopped. If you troubleshoot the PGM-FI system or the ABS/TCS first, and clear the DTCs, you'll most likely fix the problem.

As a general rule, troubleshoot DTCs that *aren't* related to communication *first*. For example, if DTC P1676 (FPTDR signal line failure) is set, and the ABS/TCS control unit has set a TCS DTC 24 thru 27 (TCS solenoid), troubleshoot the TCS DTC problem first.

A second example: If the ECM/PCM sets a DTC P1498 (EGR valve position sensor circuit voltage high), and the ABS/TCS control unit sets a TCS DTC 31, you need to troubleshoot the DTC P1498 problem first.

Front Suspension Squeaks in Cold Weather

On '97–98 Accords, '96–98 Preludes, and '97–98 Odysseys, stiff lower arm ball joints in the front suspension can squeak in cold weather. To stop the squeaking, you need to exercise the ball joint. Here's how:

1. Pop loose the front suspension lower arm ball joint from the lower arm (see section 18 in the appropriate S/M for details).
2. Move the tapered ball joint pin left and right and back and forth as far as you can **10 times** in each direction.
3. Move the tapered ball joint pin to the limit of its stroke, then push it around the joint **10 times** in a circular direction.
4. Reinstall the lower arm to the ball joint.
5. Repeat this procedure for the other side.

Troubleshooting A/T DTCs P0753, P0758, P1705, P1768,

On '98–02 Accords with A/T and '99–02 Odysseys, if the PGM-FI main relay sticks after you turn the ignition switch to LOCK (0), the PCM will repeatedly set these A/T DTCs:

- P0753 (shift solenoid valve A)
- P0758 (shift solenoid valve B)
- P1705 (transmission range switch short to ground)
- P1768 (A/T clutch pressure control solenoid valve A)

To check for a sticking PGM-FI main relay, do this:

1. Connect your PGM Tester to the 16P data link connector (DLC).
2. Turn the ignition switch to LOCK (0), and watch the PGM Tester display screen:
   - If you see the NO COMMUNICATION message as soon as you turn the switch to LOCK (0), the main relay is OK. Continue with normal troubleshooting.
   - If you *don't* see the NO COMMUNICATION message, the PCM is still getting 12 volts, which is most likely being supplied by a faulty main relay. Replace the main relay.

Radio Plays With Ignition Switch Off: '99–02 Odyssey

If your customer complains that the radio keeps playing after turning the ignition switch to LOCK (0), check to see if any of these items are installed:

- *Cell phone adapter* - Some cellular phone 12-volt adapters without blocking diodes can power the radio after the ignition switch is turned to LOCK (0). Unplug the adapter to check.
- *12-volt to 120-volt inverter*- Some inverters use capacitors to filter out noise. These capacitors can store enough energy to power the radio for several seconds after the ignition switch is turned to LOCK (0). Unplug the inverter to check.
- *Kelton Bassworks subwoofer* - The subwoofer uses capacitors to filter out noise. These capacitors can store enough energy to power the radio for several seconds after the ignition switch is turned to LOCK (0). This is normal; *don't* replace the subwoofer.

Measure Voltage Drops to Pinpoint Problems

Believe it or not, measuring for voltage drops is the best way to find unwanted resistance in a circuit or component. The procedure is quick and easy, you can use it on both the ground and power sides of the circuit, and it's done with normal system voltage going through the circuit.

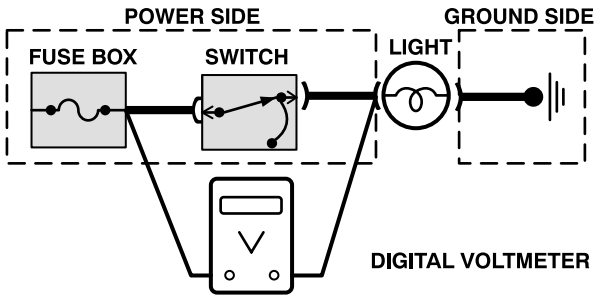
Checking for continuity with an ohmmeter lets you find simple opens and shorts easily, but measuring for voltage drops points you right to those elusive poor connections and bad switch or solenoid contacts that waste your time and make you want to pull your hair out.

A voltage drop in either the power side or ground side of a circuit means the component *isn't* getting all the current it's supposed to from that circuit. So, it *isn't* going to work the way it should, or it may not even work at all. An engine that won't crank fast enough because of corroded battery connections is a classic example of a voltage drop.

To help you understand voltage drop, let's take a quick look at Ohm's Law: ***E = I x R***. Since E = voltage, I = current, and R = resistance, another way to express this equation is ***Voltage = Current x Resistance***. Therefore, when you have current flowing through a circuit with resistance, you'll have a voltage drop.

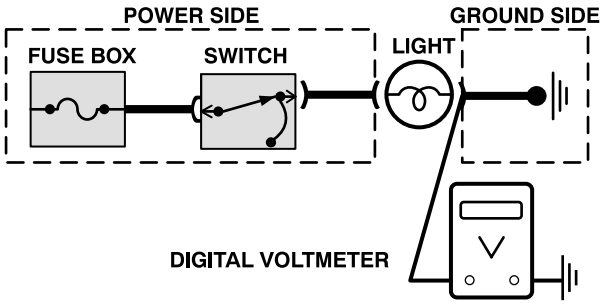
To illustrate the voltage drop principle, let's troubleshoot a light that's dimmer than normal. First, we'll check the power side of the circuit. Connect the positive lead of your digital voltmeter* to the side of the switch that's nearest the power source. Then connect the negative lead to the side of the switch that's nearest the light. Now turn on the light.

NOTE: You *can't* check for a voltage drop unless the circuit is "on" (remember, there has to be current flow). Even if the component in the circuit won't work at all, turn it on.



Let's say your voltmeter reads 4.0 V. This means there's a voltage drop of 4.0 V in the switch. The light's dim because it's only getting 8.0 V instead of 12.0 V. There's a bad connection or dirty contacts (resistance) inside the switch.

On the other hand, let's suppose there *isn't* enough voltage drop in the power side of the circuit to cause a problem (less than 1.0 V, probably only 0.1 to 0.2 V). So now we'll check the ground side of the circuit. Connect the positive lead of your voltmeter to the ground side of the light and the negative lead to a good body ground. Look at your voltmeter; it's reading 3.0 V. Give yourself a big hand. You've pinpointed a bad connection (resistance) that's causing the light to dim.



Most of the circuits you troubleshoot *aren't* this simple, but the principle remains the same:

- Find out if the voltage drop is on the power side or on the ground side.
- Measure for voltage drop from the power source to the component, then from the component to ground.
- Pinpoint the exact location of the problem by referring to the appropriate ETM, and measuring the voltage drop in each length of wire, across each connector, each fuse, each splice, and each switch in that circuit.

* Make sure you use a *digital* voltmeter. Since a voltage drop of less than 1.0 V is enough to cause a problem, an analog voltmeter just isn't sensitive enough.

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